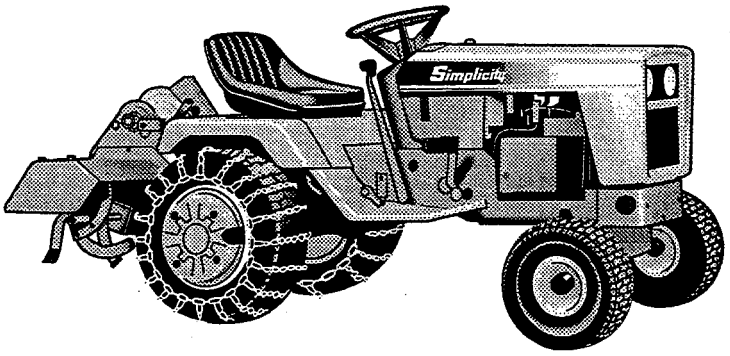
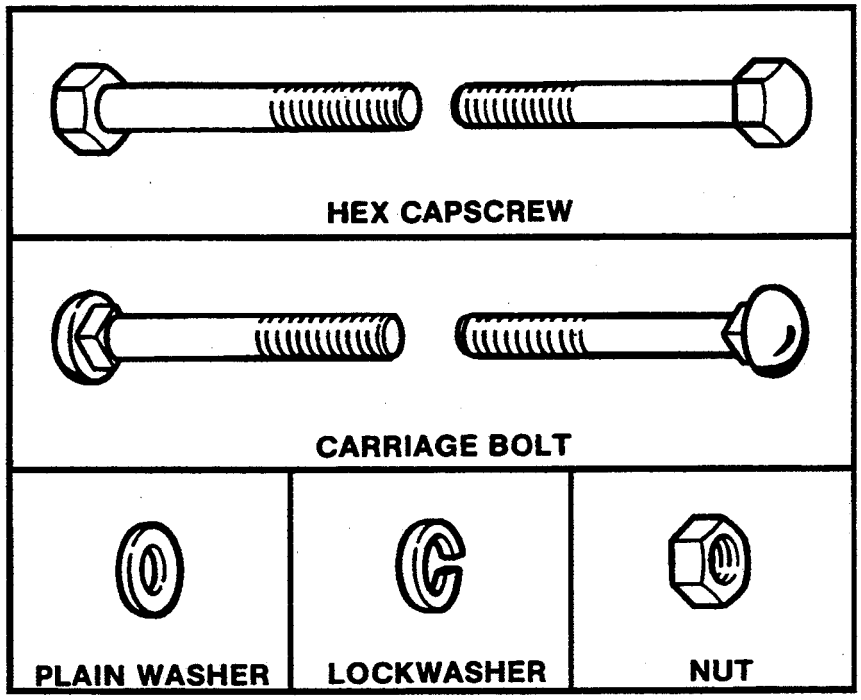
# OPERATOR'S MANUAL

## 38" Tiller

**Mfg. No. 1690989**
**Mfg. No. 1691735**

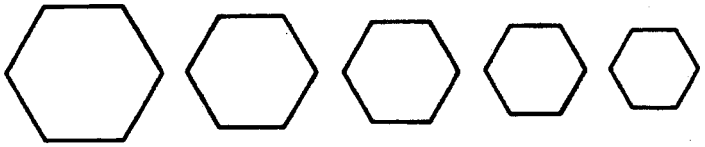



Simplicity®

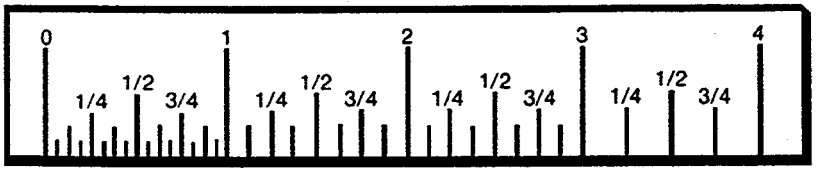



**HEX CAPSCREW IDENTIFICATION**

Shown below are actual size heads for standard screw sizes. Example: a 1/4 screw has 7/16 head and thus requires a 7/16 wrench. To measure length, use the scale below.



3/4" Head screw with 1/2" S.D. | 5/8" Head screw with 7/16" S.D. | 9/16" Head screw with 3/8" S.D. | 1/2" Head screw with 5/16" S.D. | 7/16" Head screw with 1/4" S.D.




**WASHER AND NUT IDENTIFICATION**

Place the washer or nut on the above scale to determine the inside diameter. The actual inside diameter can vary 1/16 inch. Use the scale for comparison.

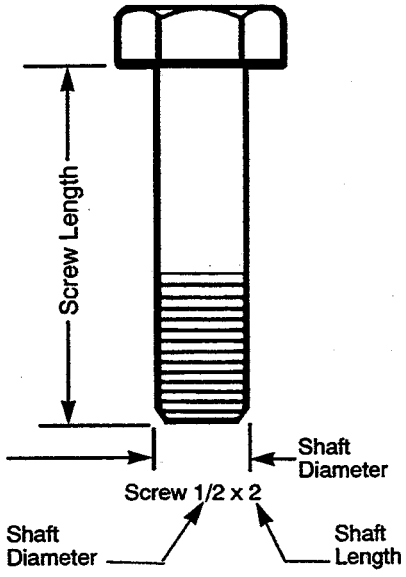
# STANDARD FASTENER IDENTIFICATION CHART

Hardware sizes given in the illustrations throughout this manual.

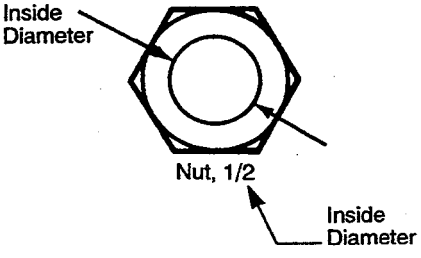
If a washer or nut is identified as "washer, 1/2" or "nut, 1/2", this means the inside diameter is 1/2 inch

If a screw is identified as "screw, 1/2 x 2", this means the shaft diameter is 1/2 inch and the shaft of the screw is 2 inches long. If a screw is identified as "screw, 1/2 - 16 x 2", the number "16" means that the screw has 16 threads per inch.

**SAMPLE: SCREW IDENTIFICATION**




**SAMPLE: NUT IDENTIFICATION**



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# Accessories

**Rear Lift Kit** - Required to Install Tiller.
**Engine Speed Rear PTO Kit** - Required to Install Tiller.
**Rear Wheel Weights, Chains, & Minimum of Three Front Quick-Tach Weights** -
Recommended for Better Performance.

# Safety Rules

***Read these safety rules and follow them closely. Failure to obey these rules could result in loss of control of vehicle, severe personal injury to yourself or bystanders, or damage to property or equipment. The triangle ⚠ in the text signifies important cautions or warnings which must be followed.***

**GENERAL**

- Read the operator's manual carefully. Be thoroughly familiar with the controls and proper use of the equipment. Know how to stop the unit and disengage the controls quickly.
- Never allow children to operate equipment. Never allow adults to operate equipment without proper instructions.
- Keep the area of operation clear of all persons, especially small children, and pets.
- Use only attachments or accessories designed for your machine. See your dealer for a complete list of recommended attachments or accessories.

**PREPARATION**

- Make sure:
  a. Tractor and attachments are in good operating condition,
  b. All safety devices and shields are in place and in good working condition, and
  c. All adjustments have been made.
- Handle gasoline with care - it is highly flammable.
  a. Use approved gasoline container.
  b. Never remove the cap of the fuel tank or add gasoline to a running or hot engine, or fill the fuel tank indoors. Wipe up spilled gasoline.
- Wear heavy footwear. Do not operate tractor when barefoot or when wearing open sandals or canvas shoes.
- Disengage all attachments and clutches and shift into neutral before attempting to start engine.
- Do not run the engine indoors. Exhaust fumes are deadly.
- Thoroughly inspect the area where the rotary tiller is to be used and remove wires and other foreign objects which might get caught on tines.

**OPERATION**

- Disengage all clutches and shift into neutral before starting engine.
- Disengage power to rotary tiller when transporting or not in use.
- Stay alert for hidden hazards or traffic when crossing roadways. Do not carry passengers.
- Never operate rotary tiller without guards, plates, or other safety protective devices in place.
- Never allow anyone in back of unit.
- Do not stop or start suddenly on slopes. Till up the face of slopes; never across the face.
- After striking a foreign object, stop the engine, disengage power take-off, and remove ignition key. Thoroughly inspect the rotary tiller for any damage before restarting and operating the rotary tiller.
- When cleaning, repairing, or inspecting, make certain rotary tiller and all moving parts have stopped. Remove ignition key to prevent accidental starting.
- Never attempt to make any adjustments while engine is running.
- Be especially careful not to touch tractor or attachment parts which might be hot from operation. Allow such parts to cool before attempting to maintain, adjust, or service.
- Never operate the rotary tiller without good visibility or light. Always be sure your feet are properly located on the footrests and keep a firm hold on the steering wheel.
- Stop engine, disengage power take-off and remove ignition key whenever you leave the operating position and before making repairs, adjustments, or inspections.
- Take all possible precautions when leaving the vehicle unattended. Disengage power take-off, lower the attachment, shift into neutral, set the parking brake, stop the engine, and remove the key.

**MAINTENANCE AND STORAGE**

- Check belts, nuts, spring clips, etc. at frequent intervals for proper tightness to be sure equipment is in safe working condition.

# Decals

**DANGER**

- **STAY CLEAR OF TILLER WHEN TRACTOR IS RUNNING. CONTACT WITH MOVING OR ROTATING PARTS WILL CAUSE PERSONAL INJURY.**
- **SHUT OFF TRACTOR, REMOVE KEY, AND LOWER TILLER BEFORE LEAVING TRACTOR SEAT, SERVICING, INSTALLING, OR DISCONNECTING TILLER.**

# Installation

### SETUP

1. Remove any shipping wire that secures parts of the tiller.

**NOTE**

The two parts separate from the tiller are the lift rod, which is installed in Step 2, and the drive shaft, which is installed during the following installation procedure.

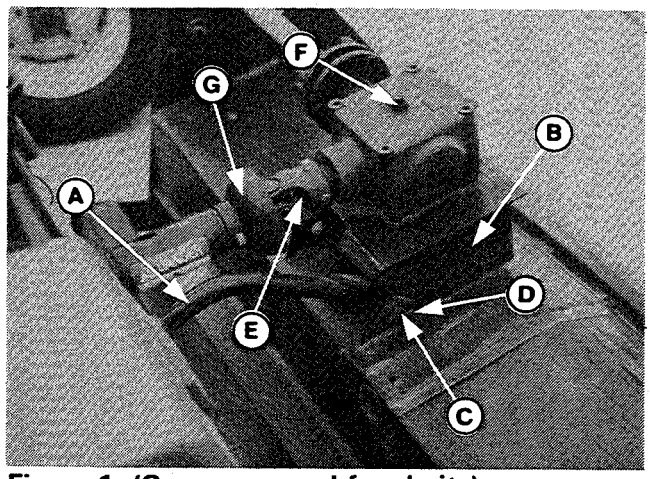


**Figure 1. (Cover removed for clarity)**

**A. Lift Rod**
**B. Mounting Bracket**
**C. Pin**
**D. Cotter Pin**
**E. Drive Shaft (Gear Box Portion)**
**F. Vent Plug**
**G. Shield**

2. Insert the lift rod (A, figure 1) into mounting bracket (B) and insert pin (C) through. Install a cotter pin (D) into each end of the pin (C) and spread the cotter pin legs fully. The lift rod is also shown installed in figure 2.
3. A pipe plug is installed in gear box for shipping only. Remove this plug and install the vent plug (F, figure 1).

### INSTALLATION

1. Back the tractor up to front of tiller so that rear lift tube (B, figure 2) is in line with the tiller lift rod (C). Be sure the tractor lift is in lowered position, then shut off the engine.
2. Remove the ignition key and set the parking brake.
3. Coat tiller lift rod (D, figure 3) with thin film of general purpose grease. Tilt rotary tiller forward, inserting tiller lift rod into rear lift tube (A). These items should fit together easily. If not, slide or rotate tiller slightly to align the two parts. Lift rod is also shown installed in figure 2.
4. Insert pin (B, figure 3) through holes in lift tube and lift rod. Then install a spring clip (C) through hole in pin.
5. Use tractor lift to raise rotary tiller until it is just clear of ground.
6. Pull lower part of rotary tiller rearward and raise lower hitch (E, figure 2) so its arms fit between tractor hitch arms (F).
7. Insert pins (G) through holes in tiller and tractor hitches. Then install spring clip (H) through hole in end of each pin.

8. The tractor half of the PTO (figure 4) must be slid into the sleeve portion of the PTO which is fastened to gear box (figure 1). Be sure shield (G) is in place. Attach shaft to tractors as follows.

   Place end against PTO shaft so that the splines are aligned. To push farther onto PTO shaft, pull ring (B, figure 4) back. While holding ring back, push onto tractor PTO shaft fully and then release. Pull back on the shaft; the ring will snap forward into the locked position in the PTO shaft groove. Test by pulling back on shaft (A). You will not be able to pull it off if properly connected. Figure 2 shows drive shaft attached. Be sure shields are in place.

## LIFT ROD ADJUSTMENT

With tiller in raised position, the distance between lowest tines and ground should not be more than 6-6-1/2". This will prevent drive shaft angle from causing unnecessary tiller noise and possible drive line failure.

## REMOVAL

To remove the tiller, disconnect the drive shaft by pulling back on locking ring (B, figure 4); then, pull drive shaft off. Remove pins and clips to disconnect hitch.

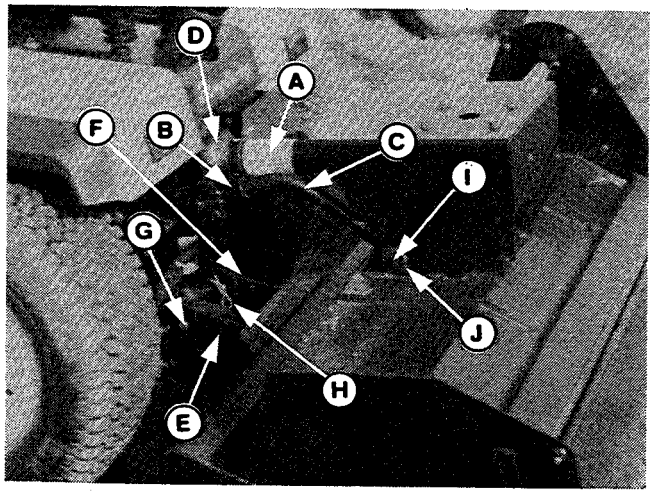


**Figure 2.**
**A. Drive Shaft**
**B. Rear Lift Tube**
**C. Lift Rod**
**D. Drive Shaft Cover**
**E. Hitch**
**F. Tractor Hitch**
**G. Pins**
**H. Spring Clip**
**I. Pin**
**J. Cotter Pin**

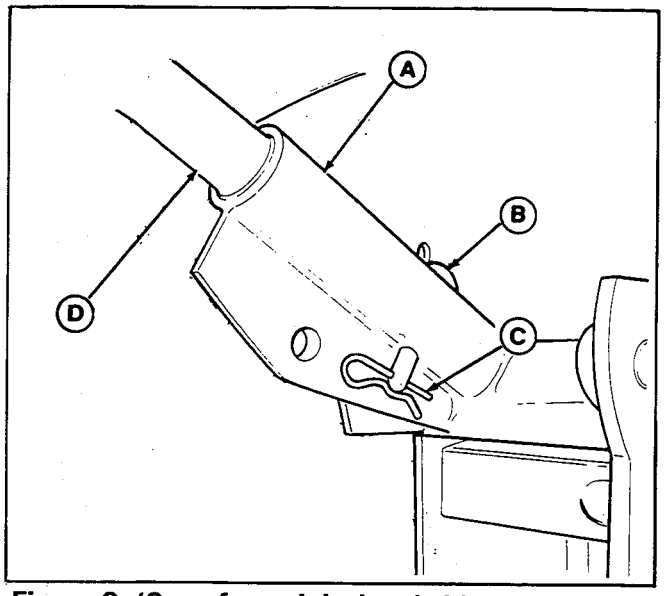


**Figure 3. (Seen from right-hand side)**
**A. Rear Lift Tube**
**B. Pin**
**C. Spring Clip**
**D. Tiller Lift Rod**

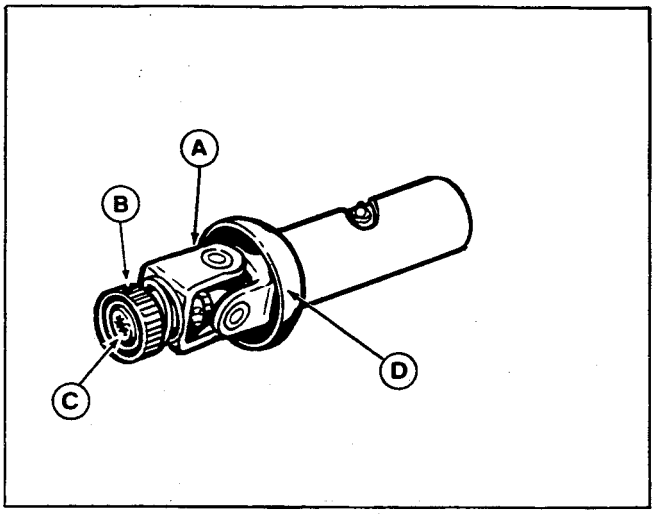


**Figure 4.**
**A. Drive Shaft**
**B. Ring**
**C. Splines**
**D. Cover**

# Operation

## CONTROLS

Refer to figure 5 for the tractor controls that are used for tiller operation. The hydraulic lift lever (A) is used to raise tiller for transport, or lower it for operation. The PTO switch (B) engages and disengages tiller drive. On 20 HP tractors, the dual pedals can be used for tight turns a low tilling speed. For instance, press only the right-hand pedal to turn right. Also, on the 20 HP tractors, the axle shift (C) should be low for tilling. The differential lock (D) can be used when additional traction is needed. Never turn tractor when tiller is in ground.

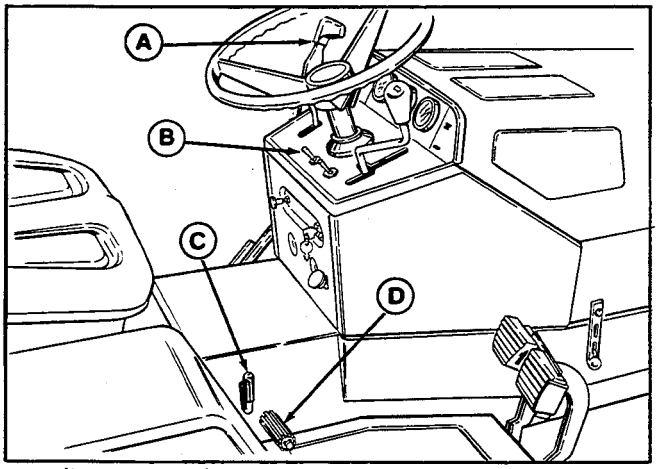


**Figure 5.**

**A. Lift Lever** **C. Two-Speed Axle Shift (20 HP Tractor)**
**B. Rear PTO** **D. Differential Lock (20 HP Tractor)**

**NOTE**

The tiller is equipped with a "slip clutch" to allow temporary slippage when tines are wedged with a rock or other object. If slippage occurs, stop the tiller immediately. The object must be removed before re-starting tiller.

## TURNING OR BACKING WITH ROTARY TILLER

Before backing up the tractor or turning the tractor sharply, always raise the tiller until it is clear of the ground. Otherwise, the tiller can be damaged.

## TRANSPORTING THE ROTARY TILLER

When you use the tractor to transport the rotary tiller to and from work areas, the rotary tiller should be raised. Also be sure the tractor PTO switch is in the disengaged position. Running tiller while in transport position for an extended period could cause damage to the tiller.

## ENGINE SPEED FOR TILLING

Operate the engine at 3/4 to full speed for tilling. Full engine speed will be necessary when tilling depth and ground conditions require full engine power.

## TRACTOR SPEED FOR TILLING

The tractor speed affects the tilling depth and the size of the soil particles. The best speed is determined by the soil conditions and land contours. For most conditions, 1-1/2 mile per hour is a good starting speed. Observe the results at this speed and adjust your speed accordingly. Refer to your tractor manual to determine the transmission gear shift lever or control settings.

**⚠ WARNING**

**After striking a foreign object, stop the engine, disengage PTO, and remove ignition key. Thoroughly inspect the rotary tiller for any damage before restarting and operating the rotary tiller.**

## STOPPING THE ROTARY TILLER

To stop the rotary tiller while it is in operation, simply move tractor PTO switch to its disengaged position. Do this immediately if you even suspect that the tines are striking rocks.

**⚠ WARNING**

**For your personal safety, be aware that tiller does not disengage when tractor clutch is depressed. The tiller is disengaged with the tractor PTO switch.**

## STARTING THE ROTARY TILLER

**⚠ WARNING**

**For your personal safety, be aware that tiller may propel the tractor forward when lowered into hard soil or sod. To stop motion in such cases, tiller must be disengaged.**

Start the rotary tiller while it is raised to the transport position. Do this by moving the PTO switch to the engaged position. Then lower the tiller to the ground slowly and allow it to dig down to the desired depth before starting the tractor into motion.

**⚠ WARNING**

**For your personal safety, never attempt to operate the rotary tiller on steep slopes. Always till up the face of slopes, and never across the face. Avoid tilling downhill on inclines as the tiller may push the tractor faster than normal speeds. Never operate the rotary tiller on slopes greater than 27 percent (15 degrees).**

## TILLING PATTERNS

Determine the best pattern before you start. Consider the size and shape of the area to be tilled. The locations of fences or building can also affect the pattern.

Usually, it is best to drive back and forth the long direction of the area. By making fewer turns, you can get the job done faster. However, after each pass, you can also back the tractor up after raising and disengaging the tiller.

Whenever possible, plan your pattern so the previously tilled soil is to the right of the tractor. Otherwise, the chain case on the right side of the tiller may ride on the soil surface, reducing tilling depth or creating drag that causes wheel spinning.

For fine seedbed soil, till the area in one direction, then till again at right angles.

## TILLING DEPTH

You will want to till to a depth that suits the seed you will plant. As a rule, till at least 2 inches (50 mm) deeper than the normal planting depth for the seed. The usual planting depth for corn, as an example, is 2 or 3 inches (50 to 76 mm). Using the rule above for this example, till the soil to a depth of 5 inches (127 mm) or more.

If you till too deeply in a single pass, the soil texture will be coarse. This problem can be avoided by making a number of passes over the same area. Till to a shallow depth on the first pass. Then increase the depth on each additional pass until the seedbed has the proper depth and texture.

To control the tilling depth, raise or lower the rotary tiller by adjusting the skid shoes (A, figure 6). Make this adjustment as follows:

**NOTE**

If skid shoes plow soft soil so much that they stop tractor, they can be removed completely. They can also be removed to obtain deeper tilling depth (6 to 7 inches).

1. Stop tractor, set parking brake, and be sure the tractor PTO lever is in disengaged position.
2. Raise the rotary tiller to its transport position.
3. Stop engine and remove ignition key.
4. Remove spring clip and pin (item B) and slide skid shoe up and down to desired height. Then reinstall pin and spring clip to secure skid shoe. Be sure both skid shoes are set to same height.

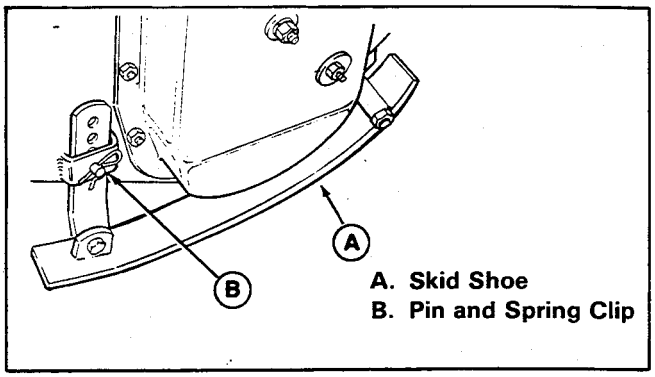


**Figure 6. Skid Shoes**
**A. Skid Shoe**
**B. Pin and Spring Clip**

## SOIL CONDITIONS

Avoid tilling soils that are too wet or too dry. Tilling wet, muddy soil is especially bad. Such soil will ball, leaving chunks that harden as they dry. Mud can also collect on the tines and drive shaft, and thereby cause equipment damage.

# Normal Care

## LUBRICATION

The tiller should be lubricated as follows before first use and then every 8 hours of operation or annually.

1. Apply 2 or 3 shots of grease to grease fitting on each side (figure 7) of tines, on the chain cover (figure 8) and on the shaft from chain drive (figure 9).
2. Apply 2 or 3 shots of grease on each journal of PTO shaft, and grease fitting in the telescoping portion of PTO shaft.
3. Also, apply 2 or 3 drops of oil to pivot points, such as shown in figure 8.
4. Check oil level in right angle gear box by removing plug on ~~top~~ side. Oil should be up to bottom of hole. Add SAE 85W90 oil.

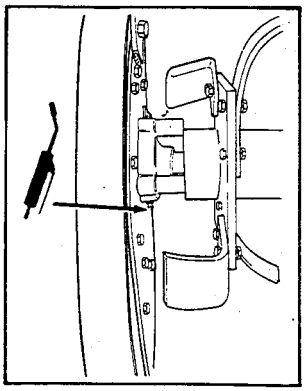

Figure 7.

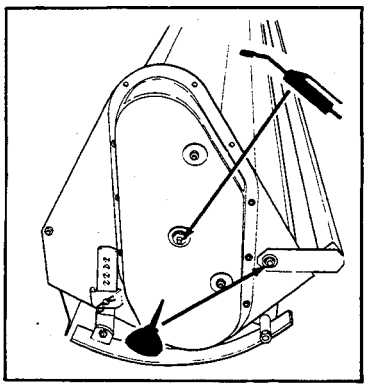

Figure 8.

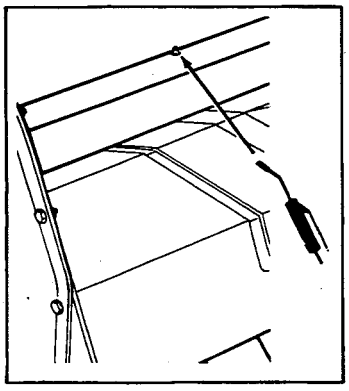

Figure 9.

## STORAGE

1. Clean the entire tiller, including the tines.
2. Coat the tines with a light film of grease or oil. Touch up painted areas as needed.

# Troubleshooting and Service

**WARNING**

**For your safety, do not try to adjust or repair the tractor or rotary tiller while the engine is running. Also, always remove the key from the ignition switch before beginning the maintenance to prevent accidental starting of the engine.**

## TROUBLESHOOTING PROCEDURES

Troubleshooting procedures are provided in figure 10. To use these procedures, first locate the problem description that best describes the touble that you have encountered. Check the possible causes one at a time in the order that they are listed. Correct any problems that are found and try to operate the rotary tiller again to see if you have eliminated the trouble.

| Problem | Cause/Remedy |
|---|---|
| **1. Rotary tiller tines do not rotate.** | **A.** PTO switch not engaged. Engage PTO switch.<br>**B.** Rotary tiller chain broken. Replace as needed.<br>**C.** Drive shaft not connected. Connect drive shaft.<br>**D.** Clutch slipping. Check for objects wedged in tines. Contact dealer to adjust clutch, if necessary. |
| **2. Tills too shallow.** | **A.** Tiller raised too high. Lower it using tractor lift.<br>**B.** Skid shoes set wrong. Raise skid shoes.<br>**C.** Engine speed too slow. Set engine for 3/4 to full speed.<br>**D.** Tractor speed too fast. Use slower speed.<br>**E.** Ground too hard. Make several passes, tilling deeper on each pass. |
| **3. Tiller leaves ground rough with large clods.** | **A.** Ground too wet. Wait until soil does not ball up when rolled in your hand.<br>**B.** Tilling too deep at one pass.<br>**C.** Tractor speed too fast. Set transmission gear shift or control for slower speed. |
| **4. Tractor handles poorley.** | **A.** Tractor speed too fast. Use slower speed, especially when running on rough or sloping surfaces.<br>**B.** Front wheels lifting. Clean dirt from tiller.<br>**C.** Rear wheels slip. Use chains or wait for dry conditions.<br>**D.** Tiller propels tractor. See causes for problem 3 above. |

**Figure 10. Troubleshooting Procedures**

## TINE REPLACEMENT

When required because of wear or breakage, replace a tine as follows:

1. Remove two capscrews (A, figure 11) and locknuts (B).
2. Remove old tine (C) from tiller.
3. Place new tine on mounting place (D). When facing front of tiller, be sure tine curves away from mounting plate with its sharp edge facing rearward when tine nears bottom of travel.
4. Insert two capscrews (A) through tine and then through mounting plate. Install and tighten locknuts (B) to a torque of 30 foot-pounds (40 N.m).

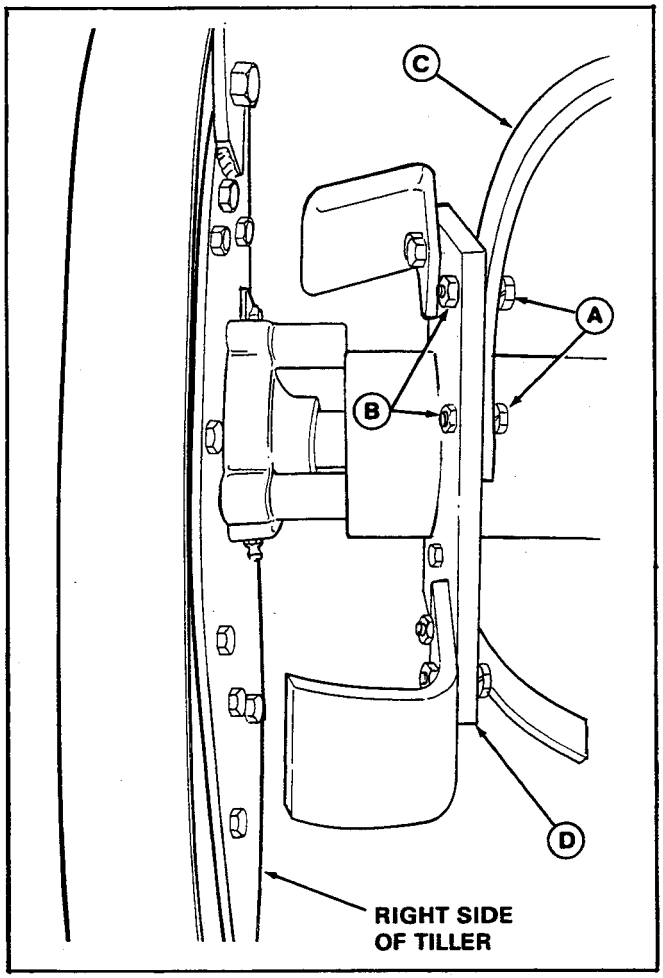


**Figure 11. Tine Replacement**

**A. Capscrews**
**B. Locknuts**
**C. Tine**
**D. Mounting Plate**

## CHAIN REPLACEMENT

When a chain breaks or becomes so loose that the chain tension adjustment cannot be performed, replace the chain as follows:

1. Remove two large nuts and one capscrew with grease fitting from face of chain cover (figure 12).

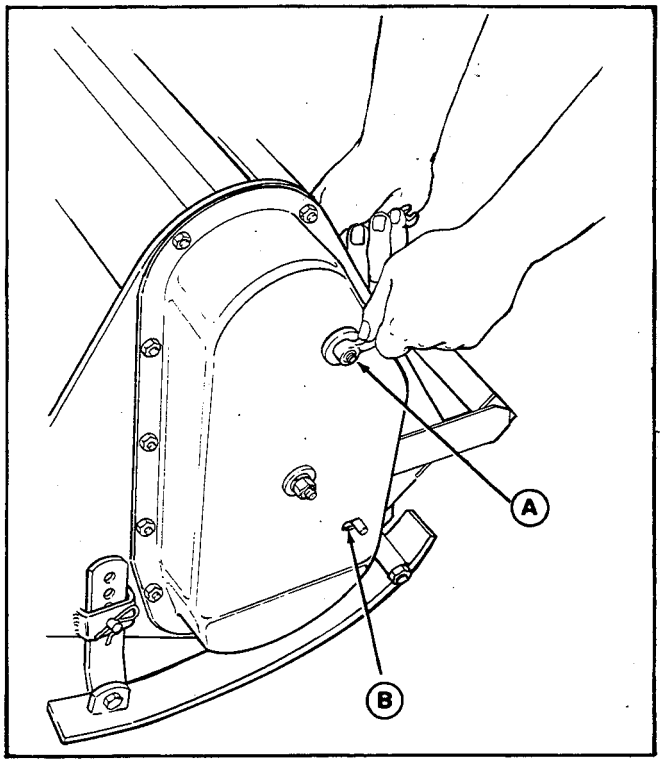


**Figure 12. Chain Tension Adjustment**

**A. Nut**
**B. Slot**

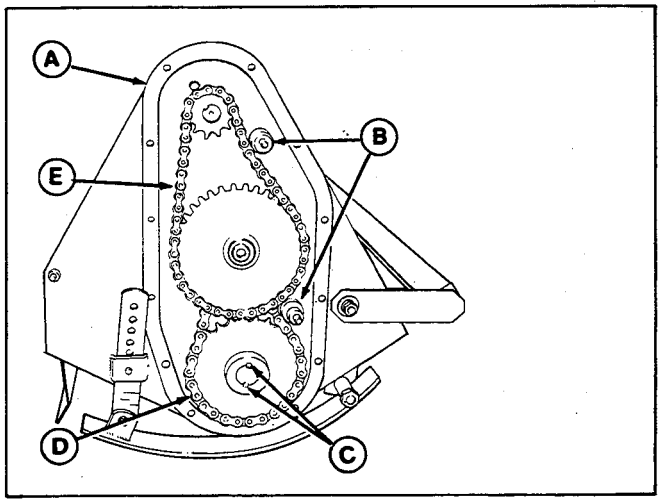


**Figure 13. Chain Replacement**

**A. Gasket**
**B. Rollers**
**C. Setscrews**
**D. Chain**
**E. Chain**

2. Remove 12 locknuts and 1 taptite capscrew that secure outer edge of chain cover. Then remove chain cover, taking care to prevent damage to gasket (A, figure 13).
3. Remove both chains (D and E). Keep chains and other hardware separated so they can be identified during installation.
4. Clean all old grease from sprockets, tiller end plate, and chain cover.
5. Check rollers (B) and gasket (A). Replace these items if they are worn or damaged. Also be sure that two setscrews (C) are tight.
6. Install new drive chains. The lower chain (D) must be installed first.
7. Cover drive chains with a thick coating of general purpose automotive grease. Pack about 2 pounds (1 kg) of this grease in bottom of chain cover.
8. Install chain cover and secure it by installing and tightening the 12 locknuts and 1 taptite capscrew around the cover edges.
9. Install and tighten capscrew with grease fitting in center hole of chain cover.
10. Install large flat washers and nuts on the two chain roller capscrews protruding through chain cover. Finger tighten nuts. Then perform chain tension adjustment. (See next paragraph).

**Chain Tension**

The capscrews which hold the chain tension rollers are mounted in slots (B, figure 12). Because the rollers wear with use, the capscrew positions must be adjusted to maintain chain tension. Once a year, or more often if the tiller is used for commercial purposes, adjust the chain tension as follows:

1. Loosen, but do not remove, nut (A).
2. Use two box wrenches as shown to hold the nut and its capscrew. Push both box wrenches to the rear as you retighten the nut.
3. Repeat this procedure for the nut over the slotted hole (B).

# TORQUE SPECIFICATIONS FOR STANDARD MACHINE HARDWARE TOLERANCE ±20%

| SIZE | SAE GRADE #2 | | SAE GRADE #5 | | SAE GRADE #8 | |
|---|---|---|---|---|---|---|
| | In./Lbs. / Ft./Lbs. | Nm. | In./Lbs. / Ft./Lbs. | Nm. | In./Lbs. / Ft./Lbs. | Nm. |
| 8-32 | 19 | 2.1 | 30 | 3.4 | 41 | 4.6 |
| 8-36 | 20 | 2.3 | 31 | 3.5 | 43 | 4.9 |
| 10-24 | 27 | 3.1 | 43 | 4.9 | 60 | 6.8 |
| 10-32 | 31 | 3.5 | 49 | 5.5 | 68 | 7.7 |
| 1/4-20 | 66 | 7.6 | 8 | 10.9 | 12 | 16.3 |
| 1/4-28 | 76 | 8.6 | 10 | 13.6 | 14 | 19. |
| 5/16-18 | 11 | 15. | 17 | 23.1 | 25 | 34. |
| 5/16-24 | 12 | 16.3 | 19 | 25.8 | 25 | 34. |
| 3/8-16 | 20 | 27.2 | 30 | 40.8 | 45 | 61.2 |
| 3/8-24 | 23 | 31.3 | 35 | 47.6 | 50 | 68. |
| 7/16-14 | 30 | 40.8 | 50 | 68. | 70 | 95.2 |
| 7/16-20 | 35 | 47.6 | 55 | 74.8 | 80 | 108.8 |
| 1/2-13 | 50 | 68. | 75 | 102. | 110 | 149.6 |
| 1/2-20 | 55 | 74.8 | 90 | 122.4 | 120 | 163.2 |
| 9/16-12 | 65 | 88.4 | 110 | 149.6 | 150 | 204. |
| 9/16-18 | 75 | 102. | 120 | 163.2 | 170 | 231.2 |
| 5/8-11 | 90 | 122.4 | 150 | 204. | 220 | 299.2 |
| 5/8-18 | 100 | 136. | 180 | 244.8 | 240 | 326.4 |
| 3/4-10 | 160 | 217.6 | 260 | 353.6 | 386 | 525. |
| 3/4-16 | 180 | 244.8 | 300 | 408. | 420 | 571.2 |
| 7/8-9 | 140 | 190.4 | 400 | 544. | 600 | 816. |
| 7/8-14 | 155 | 210.8 | 440 | 598.4 | 660 | 897.6 |
| 1-8 | 220 | 299.2 | 580 | 788.8 | 900 | 1,224. |
| 1-12 | 240 | 326.4 | 640 | 870.4 | 1,000 | 1,360. |

**NOTE:**

1. These torque values are to be used for all hardware excluding: locknuts, self-tapping screws, thread forming screws, sheet metal screws and socket head setscrews.
2. Recomended seating torque values for locknuts:
   a. For prevailing torque locknuts - use 65% of grade 5 torques.
   b. For flange whizlock nuts (and screws) - use 135% of grade 5 torques.
3. Unless otherwise noted on assembly drawings all torque values must meet this specification.

**BOLT HEAD MARKING S.A.E. GRADE:**

**SIMPLICITY MANUFACTURING, INC.**
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Port Washington, Wi 53074

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